

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
 TestAmerica Westfield  
 Westfield Executive Park  
 53 Southampton Road  
 Westfield, MA 01085  
 Tel: (413)572-4000

CHECKED FOR COMPLETENESS  
 OF PARAMETERS ORDERED BY:

*[Signature]*

TestAmerica Job ID: 360-37552-1  
 Client Project/Site: Olin Chemical Groundwater

For:  
 Olin Corporation  
 PO BOX 248  
 Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

*[Signature]*

Authorized for release by:  
 12/2/2011 2:12:56 PM  
 Chris Reynolds  
 QA Manager  
 chris.reynolds@testamericainc.com  
 Designee for  
 Becky Mason  
 Project Manager II  
 becky.mason@testamericainc.com

### LINKS

Review your project  
 results through  
**Total Access**

Have a Question?

**?** Ask  
 The  
 Expert

Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

1

2

3

4

5

6

7

8

9

10

11

12

13

14



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Detection Summary . . . . .	6
Method Summary . . . . .	8
Sample Summary . . . . .	9
Client Sample Results . . . . .	10
Definitions . . . . .	14
QC Association . . . . .	15
QC Sample Results . . . . .	17
Chronicle . . . . .	27
Certification Summary . . . . .	30
Receipt Checklists . . . . .	32
Chain of Custody . . . . .	33

# Case Narrative

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

**Job ID: 360-37552-1**

**Laboratory: TestAmerica Westfield**

## Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

## RECEIPT

The samples were received on 11/10/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 7.1 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

## DISSOLVED METALS

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011 and 11/16/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

## SPECIFIC CONDUCTIVITY

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/19/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

## ANIONS (28 DAY HOLD TIME)

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2011, 11/28/2011 and 11/30/2011.

Sulfate failed the recovery criteria low for the MSD of sample 360-37526-3 in batch 360-84080.

Refer to the QC report for details.

Samples OC-GW-CA1 (360-37552-1)[10X], OC-GW-42S (360-37552-2)[10X], OC-GW-43SR (360-37552-3)[10X], OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

## Case Narrative

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

---

### Job ID: 360-37552-1 (Continued)

---

#### Laboratory: TestAmerica Westfield (Continued)

No other difficulties were encountered during the anions analyses.

All other quality control parameters were within the acceptance limits.

#### AMMONIA

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared and analyzed on 11/23/2011.

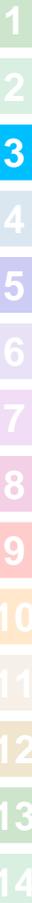
Ammonia failed the recovery criteria high for the MSD of sample 360-37526-8 in batch 360-83913. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14

<b>MassDEP Analytical Protocol Certification Form</b>					
Laboratory Name: <b>TestAmerica Westfield</b>		Project #: <b>360-37552-1</b>			
Project Location: <b>Wilmington MA</b>			RTN:		
<b>This form provides certifications for the following data set: list Laboratory Sample ID Number(s):</b> <b>360-37552-1[1-9]</b>					
Matrices: <input checked="" type="checkbox"/> Groundwater/Surface Water <input type="checkbox"/> Soil/Sediment <input type="checkbox"/> Drinking Water <input type="checkbox"/> Air <input type="checkbox"/> Other:					
<b>CAM Protocols (check all that apply below):</b>					
8260 VOC CAM II A <input type="checkbox"/>	7470/7471 Hg CAM III B <input type="checkbox"/>	Mass DEP VPH CAM IV A <input type="checkbox"/>	8081 Pesticides CAM V B <input type="checkbox"/>	7196 Hex Cr CAM VI B <input type="checkbox"/>	Mass DEP APH CAM IX A <input type="checkbox"/>
8270 SVOC CAM II B <input type="checkbox"/>	7010 Metals CAM III C <input type="checkbox"/>	Mass DEP EPH CAM IV B <input type="checkbox"/>	8151 Herbicides CAM V C <input type="checkbox"/>	8330 Explosives CAM VIII A <input type="checkbox"/>	TO-15 VOC CAM IX B <input type="checkbox"/>
6010 Metals CAM III A <input checked="" type="checkbox"/>	6020 Metals CAM III D <input type="checkbox"/>	8082 PCB CAM V A <input type="checkbox"/>	9014 Total Cyanide/PAC CAM VI A <input type="checkbox"/>	332.0 Perchlorate CAM VIII B <input type="checkbox"/>	
<b>Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status</b>					
<b>A</b>	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>B</b>	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>C</b>	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>D</b>	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>E</b>	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).				<input type="checkbox"/> Yes <input type="checkbox"/> No
	b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?				<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>F</b>	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Responses to Questions G, H and I below are required for "Presumptive Certainty" status</b>					
<b>G</b>	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <sup>1</sup>
<b>Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350</b>					
<b>H</b>	Were all QC performance standards specified in the CAM protocol(s) achieved?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>I</b>	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?				<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<sup>1</sup> All negative responses must be addressed in an attached laboratory narrative.					
<i>I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.</i>					
Signature: <u></u>		Position: <u>Laboratory Director</u>			
Printed Name: <u>Steven C. Hartmann</u>		Date: <u>12/2/11 13:52</u>			
This form has been electronically signed and approved					

# Detection Summary

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Client Sample ID: OC-GW-CA1

## Lab Sample ID: 360-37552-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	17	J	100	13	ug/L	1		6010B	Dissolved
Chromium	6.6		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	93		20	20	mg/L	10		300.0	Total/NA
Chloride	9.6		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.77		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	690		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-42S

## Lab Sample ID: 360-37552-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	450		100	13	ug/L	1		6010B	Dissolved
Chromium	7.9		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	12		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	1.0		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	500		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-43SR

## Lab Sample ID: 360-37552-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	53	J	100	13	ug/L	1		6010B	Dissolved
Chromium	1.2	J	5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	32		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	180		10	10	mg/L	10		300.0	Total/NA
Ammonia	2.5		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	730		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-34SR

## Lab Sample ID: 360-37552-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	1.4	J	5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	7.9		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	2.3		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.21		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	79		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-34D

## Lab Sample ID: 360-37552-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	15		10	1.3	ug/L	2		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	60		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	4.9		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	20		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	250		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-202S

## Lab Sample ID: 360-37552-6

# Detection Summary

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Client Sample ID: OC-GW-202S (Continued)

Lab Sample ID: 360-37552-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	4.8	J	5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	330		20	20	mg/L	10		300.0	Total/NA
Chloride	45		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	60		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-GW-202D

Lab Sample ID: 360-37552-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	13000		200	25	ug/L	2		6010B	Dissolved
Chromium	1000		10	1.3	ug/L	2		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1700		100	100	mg/L	50		300.0	Total/NA
Chloride	260		50	50	mg/L	50		300.0	Total/NA
Ammonia	300		5.0	5.0	mg/L	50		L107-06-1B	Total/NA
Specific Conductance	4400		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-PZ-24

Lab Sample ID: 360-37552-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	18		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	690		20	20	mg/L	10		300.0	Total/NA
Chloride	23		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	73		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	2000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

## Client Sample ID: OC-PZ-25

Lab Sample ID: 360-37552-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	9.9		5.0	0.65	ug/L	1		6010B	Dissolved
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	490		20	20	mg/L	10		300.0	Total/NA
Chloride	21		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	51		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1400		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

# Method Summary

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

#### Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

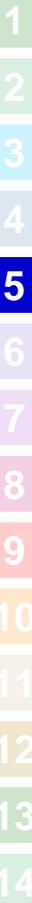
LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000



# Sample Summary

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37552-1	OC-GW-CA1	Water	11/10/11 10:50	11/10/11 18:20
360-37552-2	OC-GW-42S	Water	11/10/11 09:50	11/10/11 18:20
360-37552-3	OC-GW-43SR	Water	11/10/11 08:45	11/10/11 18:20
360-37552-4	OC-GW-34SR	Water	11/10/11 11:35	11/10/11 18:20
360-37552-5	OC-GW-34D	Water	11/10/11 12:20	11/10/11 18:20
360-37552-6	OC-GW-202S	Water	11/10/11 10:10	11/10/11 18:20
360-37552-7	OC-GW-202D	Water	11/10/11 09:35	11/10/11 18:20
360-37552-8	OC-PZ-24	Water	11/10/11 11:10	11/10/11 18:20
360-37552-9	OC-PZ-25	Water	11/10/11 11:40	11/10/11 18:20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# Client Sample Results

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: 6010B - Dissolved Metals - Dissolved

**Client Sample ID: OC-GW-CA1**  
**Date Collected: 11/10/11 10:50**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-1**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17	J	100	13	ug/L			11/15/11 18:25	1
Chromium	6.6		5.0	0.65	ug/L			11/15/11 18:25	1

**Client Sample ID: OC-GW-42S**  
**Date Collected: 11/10/11 09:50**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-2**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	450		100	13	ug/L			11/15/11 18:37	1
Chromium	7.9		5.0	0.65	ug/L			11/15/11 18:37	1

**Client Sample ID: OC-GW-43SR**  
**Date Collected: 11/10/11 08:45**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-3**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	53	J	100	13	ug/L			11/15/11 18:40	1
Chromium	1.2	J	5.0	0.65	ug/L			11/15/11 18:40	1

**Client Sample ID: OC-GW-34SR**  
**Date Collected: 11/10/11 11:35**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-4**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:43	1
Chromium	1.4	J	5.0	0.65	ug/L			11/15/11 18:43	1

**Client Sample ID: OC-GW-34D**  
**Date Collected: 11/10/11 12:20**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-5**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		200	25	ug/L			11/16/11 19:20	2
Chromium	15		10	1.3	ug/L			11/16/11 19:20	2

**Client Sample ID: OC-GW-202S**  
**Date Collected: 11/10/11 10:10**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-6**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:54	1
Chromium	4.8	J	5.0	0.65	ug/L			11/15/11 18:54	1

**Client Sample ID: OC-GW-202D**  
**Date Collected: 11/10/11 09:35**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-7**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	13000		200	25	ug/L			11/16/11 19:23	2

# Client Sample Results

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: 6010B - Dissolved Metals - Dissolved (Continued)

**Client Sample ID: OC-GW-202D**  
**Date Collected: 11/10/11 09:35**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-7**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	1000		10	1.3	ug/L			11/16/11 19:23	2

**Client Sample ID: OC-PZ-24**  
**Date Collected: 11/10/11 11:10**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-8**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 19:00	1
Chromium	18		5.0	0.65	ug/L			11/15/11 19:00	1

**Client Sample ID: OC-PZ-25**  
**Date Collected: 11/10/11 11:40**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-9**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 19:03	1
Chromium	9.9		5.0	0.65	ug/L			11/15/11 19:03	1

# Client Sample Results

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## General Chemistry

**Client Sample ID: OC-GW-CA1**  
**Date Collected: 11/10/11 10:50**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-1**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	93		20	20	mg/L			11/28/11 22:10	10
Chloride	9.6		1.0	1.0	mg/L			11/19/11 08:14	1
Ammonia	0.77		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:33	1
Specific Conductance	690		1.0	1.0	umhos/cm			11/19/11 08:25	1

**Client Sample ID: OC-GW-42S**  
**Date Collected: 11/10/11 09:50**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-2**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	12		2.0	2.0	mg/L			11/19/11 08:31	1
Chloride	120		10	10	mg/L			11/28/11 21:38	10
Ammonia	1.0		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:34	1
Specific Conductance	500		1.0	1.0	umhos/cm			11/19/11 08:26	1

**Client Sample ID: OC-GW-43SR**  
**Date Collected: 11/10/11 08:45**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-3**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	32		2.0	2.0	mg/L			11/19/11 08:47	1
Chloride	180		10	10	mg/L			11/28/11 21:54	10
Ammonia	2.5		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:37	1
Specific Conductance	730		1.0	1.0	umhos/cm			11/19/11 08:27	1

**Client Sample ID: OC-GW-34SR**  
**Date Collected: 11/10/11 11:35**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-4**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.9		2.0	2.0	mg/L			11/19/11 09:03	1
Chloride	2.3		1.0	1.0	mg/L			11/19/11 09:03	1
Ammonia	0.21		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:38	1
Specific Conductance	79		1.0	1.0	umhos/cm			11/19/11 08:29	1

**Client Sample ID: OC-GW-34D**  
**Date Collected: 11/10/11 12:20**  
**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-5**  
**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	60		2.0	2.0	mg/L			11/19/11 09:19	1
Chloride	4.9		1.0	1.0	mg/L			11/19/11 09:19	1
Ammonia	20		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:39	1
Specific Conductance	250		1.0	1.0	umhos/cm			11/19/11 08:30	1

# Client Sample Results

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## General Chemistry

**Client Sample ID: OC-GW-202S**

**Date Collected: 11/10/11 10:10**

**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-6**

**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	330		20	20	mg/L			11/28/11 22:26	10
Chloride	45		1.0	1.0	mg/L			11/19/11 09:35	1
Ammonia	60		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:04	10
Specific Conductance	1100		1.0	1.0	umhos/cm			11/19/11 08:32	1

**Client Sample ID: OC-GW-202D**

**Date Collected: 11/10/11 09:35**

**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-7**

**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1700		100	100	mg/L			11/30/11 09:23	50
Chloride	260		50	50	mg/L			11/30/11 09:23	50
Ammonia	300		5.0	5.0	mg/L		11/23/11 09:19	11/23/11 15:12	50
Specific Conductance	4400		1.0	1.0	umhos/cm			11/19/11 08:33	1

**Client Sample ID: OC-PZ-24**

**Date Collected: 11/10/11 11:10**

**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-8**

**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	690		20	20	mg/L			11/28/11 22:42	10
Chloride	23		1.0	1.0	mg/L			11/19/11 10:07	1
Ammonia	73		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:06	10
Specific Conductance	2000		1.0	1.0	umhos/cm			11/19/11 08:39	1

**Client Sample ID: OC-PZ-25**

**Date Collected: 11/10/11 11:40**

**Date Received: 11/10/11 18:20**

**Lab Sample ID: 360-37552-9**

**Matrix: Water**

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	490		20	20	mg/L			11/19/11 12:48	10
Chloride	21		1.0	1.0	mg/L			11/19/11 12:32	1
Ammonia	51		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:07	10
Specific Conductance	1400		1.0	1.0	umhos/cm			11/19/11 08:42	1

## Definitions/Glossary

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

### Qualifiers

#### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# QC Association Summary

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Metals

### Analysis Batch: 83422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 DU	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 MS	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-2	OC-GW-42S	Dissolved	Water	6010B	
360-37552-3	OC-GW-43SR	Dissolved	Water	6010B	
360-37552-4	OC-GW-34SR	Dissolved	Water	6010B	
360-37552-6	OC-GW-202S	Dissolved	Water	6010B	
360-37552-8	OC-PZ-24	Dissolved	Water	6010B	
360-37552-9	OC-PZ-25	Dissolved	Water	6010B	
LCS 360-83422/1	Lab Control Sample	Total/NA	Water	6010B	
LCS D 360-83422/10	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83422/2	Method Blank	Total/NA	Water	6010B	

### Analysis Batch: 83502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-5	OC-GW-34D	Dissolved	Water	6010B	
360-37552-7	OC-GW-202D	Dissolved	Water	6010B	
LCS 360-83502/1	Lab Control Sample	Total/NA	Water	6010B	
LCS D 360-83502/9	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83502/2	Method Blank	Total/NA	Water	6010B	

## General Chemistry

### Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	SM 2510B	
360-37552-2	OC-GW-42S	Total/NA	Water	SM 2510B	
360-37552-3	OC-GW-43SR	Total/NA	Water	SM 2510B	
360-37552-4	OC-GW-34SR	Total/NA	Water	SM 2510B	
360-37552-5	OC-GW-34D	Total/NA	Water	SM 2510B	
360-37552-6	OC-GW-202S	Total/NA	Water	SM 2510B	
360-37552-7	OC-GW-202D	Total/NA	Water	SM 2510B	
360-37552-8	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-8 DU	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-9	OC-PZ-25	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

### Analysis Batch: 83764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-4	OC-GW-34SR	Total/NA	Water	300.0	
360-37552-5	OC-GW-34D	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-83764/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83764/5	Method Blank	Total/NA	Water	300.0	

# QC Association Summary

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## General Chemistry (Continued)

### Analysis Batch: 83765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
LCS 360-83765/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83765/5	Method Blank	Total/NA	Water	300.0	

### Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	Distill/Ammonia	
360-37552-2	OC-GW-42S	Total/NA	Water	Distill/Ammonia	
360-37552-3	OC-GW-43SR	Total/NA	Water	Distill/Ammonia	
360-37552-4	OC-GW-34SR	Total/NA	Water	Distill/Ammonia	
360-37552-5	OC-GW-34D	Total/NA	Water	Distill/Ammonia	
360-37552-6	OC-GW-202S	Total/NA	Water	Distill/Ammonia	
360-37552-7	OC-GW-202D	Total/NA	Water	Distill/Ammonia	
360-37552-8	OC-PZ-24	Total/NA	Water	Distill/Ammonia	
360-37552-9	OC-PZ-25	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

### Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	L107-06-1B	83810
360-37552-2	OC-GW-42S	Total/NA	Water	L107-06-1B	83810
360-37552-3	OC-GW-43SR	Total/NA	Water	L107-06-1B	83810
360-37552-4	OC-GW-34SR	Total/NA	Water	L107-06-1B	83810
360-37552-5	OC-GW-34D	Total/NA	Water	L107-06-1B	83810
360-37552-6	OC-GW-202S	Total/NA	Water	L107-06-1B	83810
360-37552-7	OC-GW-202D	Total/NA	Water	L107-06-1B	83810
360-37552-8	OC-PZ-24	Total/NA	Water	L107-06-1B	83810
360-37552-9	OC-PZ-25	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

### Analysis Batch: 84080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-84080/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84080/3	Method Blank	Total/NA	Water	300.0	

### Analysis Batch: 84154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-7	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MS	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MSD	OC-GW-202D	Total/NA	Water	300.0	
LCS 360-84154/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84154/3	Method Blank	Total/NA	Water	300.0	

# QC Sample Results

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83422/2

Matrix: Water

Analysis Batch: 83422

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:13	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 18:13	1

Lab Sample ID: LCS 360-83422/1

Matrix: Water

Analysis Batch: 83422

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5050		ug/L		101	80 - 120
Chromium	1000	1030		ug/L		103	80 - 120

Lab Sample ID: LCSD 360-83422/10

Matrix: Water

Analysis Batch: 83422

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5280		ug/L		106	80 - 120	4	20
Chromium	1000	1070		ug/L		107	80 - 120	4	20

Lab Sample ID: MB 360-83502/2

Matrix: Water

Analysis Batch: 83502

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/16/11 18:36	1
Chromium	ND		5.0	0.65	ug/L			11/16/11 18:36	1

Lab Sample ID: LCS 360-83502/1

Matrix: Water

Analysis Batch: 83502

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	4980		ug/L		100	80 - 120
Chromium	1000	996		ug/L		100	80 - 120

Lab Sample ID: LCSD 360-83502/9

Matrix: Water

Analysis Batch: 83502

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	4640		ug/L		93	80 - 120	7	20
Chromium	1000	941		ug/L		94	80 - 120	6	20

Lab Sample ID: 360-37552-1 MS

Matrix: Water

Analysis Batch: 83422

Client Sample ID: OC-GW-CA1

Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	17	J	5000	5190		ug/L		103	75 - 125
Chromium	6.6		1000	1040		ug/L		104	75 - 125

# QC Sample Results

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: 6010B - Dissolved Metals (Continued)

Lab Sample ID: 360-37552-1 DU  
Matrix: Water  
Analysis Batch: 83422

Client Sample ID: OC-GW-CA1  
Prep Type: Dissolved

Analyte	Sample		DU		Unit	D	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier					
Aluminum	17	J	18.4	J	ug/L			10	20
Chromium	6.6		6.76		ug/L			3	20

## Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83764/5  
Matrix: Water  
Analysis Batch: 83764

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	ND		2.0	2.0	mg/L			11/19/11 03:57	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 03:57	1

Lab Sample ID: LCS 360-83764/6  
Matrix: Water  
Analysis Batch: 83764

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	42.1		mg/L		105	85 - 115

Lab Sample ID: MB 360-83765/5  
Matrix: Water  
Analysis Batch: 83765

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	ND		2.0	2.0	mg/L			11/19/11 10:56	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 10:56	1

Lab Sample ID: LCS 360-83765/6  
Matrix: Water  
Analysis Batch: 83765

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	42.0		mg/L		105	85 - 115

Lab Sample ID: MB 360-84080/3  
Matrix: Water  
Analysis Batch: 84080

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	ND		2.0	2.0	mg/L			11/28/11 20:17	1
Chloride	ND		1.0	1.0	mg/L			11/28/11 20:17	1

Lab Sample ID: LCS 360-84080/4  
Matrix: Water  
Analysis Batch: 84080

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

# QC Sample Results

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84080/4  
Matrix: Water  
Analysis Batch: 84080

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	39.8		mg/L		99	85 - 115

Lab Sample ID: MB 360-84154/3  
Matrix: Water  
Analysis Batch: 84154

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/30/11 08:19	1
Chloride	ND		1.0	1.0	mg/L			11/30/11 08:19	1

Lab Sample ID: LCS 360-84154/4  
Matrix: Water  
Analysis Batch: 84154

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	78.0		mg/L		97	85 - 115
Chloride	40.0	41.2		mg/L		103	85 - 115

Lab Sample ID: 360-37552-7 MS  
Matrix: Water  
Analysis Batch: 84154

Client Sample ID: OC-GW-202D  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	1700		1000	2840		mg/L		109	75 - 125
Chloride	260		500	817		mg/L		110	75 - 125

Lab Sample ID: 360-37552-7 MSD  
Matrix: Water  
Analysis Batch: 84154

Client Sample ID: OC-GW-202D  
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	1700		1000	2670		mg/L		93	75 - 125	6	20
Chloride	260		500	778		mg/L		103	75 - 125	5	20

## Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83810/1-A  
Matrix: Water  
Analysis Batch: 83913

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 83810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A  
Matrix: Water  
Analysis Batch: 83913

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 83810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	10.4		mg/L		104	90 - 110

# QC Sample Results

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Method: SM 2510B - Conductivity, Specific Conductance

**Lab Sample ID: MB 360-83626/3**

**Matrix: Water**

**Analysis Batch: 83626**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/19/11 08:19	1

**Lab Sample ID: LCS 360-83626/1**

**Matrix: Water**

**Analysis Batch: 83626**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1400		umhos/cm		99	85 - 115

**Lab Sample ID: 360-37552-8 DU**

**Matrix: Water**

**Analysis Batch: 83626**

**Client Sample ID: OC-PZ-24**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	2000		1960		umhos/cm		0.2	20



TestAmerica Westfield  
Analytical Dilution Preparation Log

Date: 11-16-11

Analyst Initials	Date	Method	LIMS Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution			Comments
									Sample Aliquot 2	Units	Final Volume 2	
JS	11-16-11	6010	37552-5	2x	5	mL	10	mL				
↓	↓	↓	37552-7	2x	5	mL	10	mL				

entries completed by day [ new page each day]

031h





Date: 11-23-11

Analyst Initials	Date	Method	LIMS Sample ID	Rptd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution			Comments		
									Sample Aliquot 2	Units	Final Volume 2		Units	
PUE	11-23-11	N13	37526A3A	10X	1	uL	10	uL						
						MS								
						MSD								
						37525A2A	10X	1	uL	10	uL			
						37526A1A	10X	1						
						A2A	10X	1						
						A4A	10X	1						
						A5A	10X	1						
						A6A	10X	1						
						A7A	10X	1						
						A8A	10X	1						
						MS	10X	1						
						MSD	10X	1						
		37527B1	10X	1										
		37528B6A	10X	1										
		B7A	10X	1										
		B8A	10X	1										
		B9A	10X	1										
		37529A1A	10X	?										

entries completed by day [ new page each day ]

011e



Date: 11-28-11

TestAmerica Westfield  
Analytical Dilution Preparation Log

Analyst Initials	Date	Method	LIMS Sample ID	Rprd Dil.	Sample Allquot 1	Units	Final Volume 1	Units	Serial Dilution			Comments
									Sample Allquot 2	Units	Final Volume 2	
RUE	11-28-11	300.0	37526 E3	20X	500	µL	10	µL				
			37552 C2	10X	1	µL						
			C3	10X	1	µL						
			C1	10X	1	µL						
			C6	10X	1	µL						
			C8	10X	1	µL						
			37526 B4	10X	1	µL						
				20X	500	µL						
			B1	10X	1	µL						
			B2	10X	1	µL						
			37552 C7	20X	500	µL						

entries completed by day [ new page each day]





# Lab Chronicle

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Client Sample ID: OC-GW-CA1

Lab Sample ID: 360-37552-1

Date Collected: 11/10/11 10:50

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:25	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:25	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:14	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:33	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:10	RWE	TAL WFD

## Client Sample ID: OC-GW-42S

Lab Sample ID: 360-37552-2

Date Collected: 11/10/11 09:50

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:37	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:26	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:31	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:34	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:38	RWE	TAL WFD

## Client Sample ID: OC-GW-43SR

Lab Sample ID: 360-37552-3

Date Collected: 11/10/11 08:45

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:40	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:27	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:47	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:37	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:54	RWE	TAL WFD

## Client Sample ID: OC-GW-34SR

Lab Sample ID: 360-37552-4

Date Collected: 11/10/11 11:35

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:43	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:29	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:03	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:38	RWE	TAL WFD

# Lab Chronicle

Client: Olin Corporation  
 Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

## Client Sample ID: OC-GW-34D

Lab Sample ID: 360-37552-5

Date Collected: 11/10/11 12:20

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:20	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:30	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:19	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:39	RWE	TAL WFD

## Client Sample ID: OC-GW-202S

Lab Sample ID: 360-37552-6

Date Collected: 11/10/11 10:10

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:54	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:32	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:35	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:04	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:26	RWE	TAL WFD

## Client Sample ID: OC-GW-202D

Lab Sample ID: 360-37552-7

Date Collected: 11/10/11 09:35

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:23	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:33	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		50	83913	11/23/11 15:12	RWE	TAL WFD
Total/NA	Analysis	300.0		50	84154	11/30/11 09:23	AMS	TAL WFD

## Client Sample ID: OC-PZ-24

Lab Sample ID: 360-37552-8

Date Collected: 11/10/11 11:10

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 19:00	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:39	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 10:07	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:06	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:42	RWE	TAL WFD

# Lab Chronicle

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

**Client Sample ID: OC-PZ-25**

**Lab Sample ID: 360-37552-9**

**Date Collected: 11/10/11 11:40**

**Matrix: Water**

**Date Received: 11/10/11 18:20**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 19:03	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:42	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83765	11/19/11 12:32	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83765	11/19/11 12:48	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:07	RWE	TAL WFD

**Laboratory References:**

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

## Certification Summary

Client: Olin Corporation  
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

## State Accreditation Matrix

Method Name	Description	State where <b>Primary</b> Accreditation is Carried		
		New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 Cl F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P	
1103.1	E.coli		ambient/ source	
Enterolert	Enterococcus			
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	P	P	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pinsky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	P	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accredited under NELAC

For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory

The lab carries additional accreditations with several states. This is the laboratories typical listing but is subject to change based on the laboratories current certification standing.

## Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37552-1

**Login Number: 37552**

**List Number: 1**

**Creator: Ard, Vanessa L**

**List Source: TestAmerica Westfield**

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**TestAmerica Westfield**

Westfield Executive Park 53 Southampton Road  
Westfield, MA 01085  
Phone (413) 572-4000 Fax (413) 572-3707

**Chain of Custody Record**

**TestAmerica**

THE LEADER IN ENVIRONMENTAL TESTING

**Client Information**  
 Client Contact: James Carhwell Lab PM: Betsy Mann  
 Company: Olin Corporation Carrier Tracking No(s): 017508  
 Address: 57 Everses St E-Mail:  
 City: Wilmington  
 State, Zip: MA 01887  
 Phone: 01887  
 Email:  
 Project Name/number: Olin Semireal Global Supply  
 Site: Olin Wilmington MA

Sample Identification	Sample Date	Sample Type (C-comp, G-grab)	Matrix (W-water, S-solid, O-organic, B-Tissue, A-Air)	Sample Date	Sample Time	Sample Type (C-comp, G-grab)	Matrix (W-water, S-solid, O-organic, B-Tissue, A-Air)	Sampler's Initials	Field Filled Sample?	Perform MS/MSD?	Analysis Requested	Carrier Tracking No(s)	COC No: <u>017508</u>	Page:	Job #:	Preservation Codes:		Regulatory programs:		Special Instructions/Note:	
																A - HCL	J - DI Water	MCP	GW1/S1		RCP
OC-GW-CA1	11/10/11	G	G-W	1050		G	G-W	GM	Y	N	X										
OC-GW-425	11/10/11	G	G-W	0950		G	G-W	GM	Y	N	X										
OC-GW-435R	11/10/11	G	G-W	0845		G	G-W	GM	Y	N	X										
OC-GW-345R	11/10/11	G	G-W	1135		G	G-W	GM	Y	N	X										
OC-GW-341	11/10/11	G	G-W	1220		G	G-W	GM	Y	N	X										
OC-GW-2025	11/10/11	G	G-W	1010		G	G-W	GM	Y	N	X										
OC-GW-202D	11/10/11	G	G-W	0935		G	G-W	GM	Y	N	X										
OC-P2-24	11/10/11	G	G-W	1110		G	G-W	GM	Y	N	X										
OC-P2-25	11/10/11	G	G-W	1140		G	G-W	GM	Y	N	X										

**Possible Hazard Identification**  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological

**Deliverable Requested:** I, II, III, IV, Other (specify) \_\_\_\_\_

**Relinquished by:** [Signature] Date/Time: 11/10/11 1500  
**Relinquished by:** [Signature] Date/Time: 11/10/11 1800  
**Relinquished by:** [Signature] Date/Time: 11/10/11 1800

**Custody Seals intact:**  Yes  No  
**Custody Seal No.:** 7/1/11

**Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)**  
 Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

**Special Instructions/QC Requirements:**

**Received by:** [Signature] Date/Time: 11/10/11 1500  
**Received by:** [Signature] Date/Time: 11/10/11 1800  
**Received by:** [Signature] Date/Time: 11/10/11 1800

**Cooler Temperature(s) °C and Other Remarks:**

